

# **RF Protocol**

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***XCath***

## Contents

|                                                                                  |           |
|----------------------------------------------------------------------------------|-----------|
| <b>1. Specification</b>                                                          | <b>3</b>  |
| <b>2. Configuration of IS-4500C1</b>                                             | <b>3</b>  |
| 2.1 Connect                                                                      | 3         |
| 2.2 USB Driver                                                                   | 4         |
| <b>3. Operation method of IS-4500C1 RFID</b>                                     | <b>5</b>  |
| <b>4. Usage of ISReaderPro V3.0</b>                                              | <b>6</b>  |
| <b>5. Protocol Format</b>                                                        | <b>8</b>  |
| 5.1 Request (Target , PC → IS-4500C1)                                            | 8         |
| 5.2 Request (Target , PC → IS-4500C1)                                            | 8         |
| <b>6. Check Sum Calculation method</b>                                           | <b>9</b>  |
| <b>7. Protocol (NTAG)</b>                                                        | <b>10</b> |
| 7.1 NTAG Active Request (Target , PC → IS-4500C1)                                | 10        |
| 7.2 NTAG Active Response (IS-4500C1 → Target , PC)                               | 10        |
| 7.3 NTAG Authenticate Request (Target , PC → IS-4500C1)                          | 11        |
| 7.4 NTAG Authenticate Response (IS-4500C1 → Target , PC)                         | 11        |
| 7.5 NTAG Authenticate Key Value Change Request (Target , PC → IS-4500C1)         | 12        |
| 7.6 NTAG Authenticate Key Value Change Response (IS-4500C1 → Target , PC)        | 12        |
| 7.7 NTAG Block Read 16 Byte Request (Target , PC → IS-4500C1)                    | 13        |
| 7.8 NTAG Block Read 16 Byte Response (IS-4500C1 → Target , PC)                   | 13        |
| 7.9 NTAG Block Read 4 Byte Request (Target , PC → IS-4500C1)                     | 14        |
| 7.10 NTAG Block Read 4 Byte Response (IS-4500C1 → Target , PC)                   | 14        |
| 7.11 NTAG Block Write 4 Byte Request (Target , PC → IS-4500C1)                   | 15        |
| 7.12 NTAG Block Write 4 Byte Response (IS-4500C1 → Target , PC)                  | 15        |
| 7.13 NTAG Block Write 16 Byte Request (Target , PC → IS-4500C1)                  | 16        |
| 7.14 NTAG Block Write 16 Byte Response (IS-4500C1 → Target , PC)                 | 16        |
| 7.15 Version Read Request (Target , PC → IS-4500C1)                              | 17        |
| 7.16 NTAG Version Read Response (IS-4500C1 → Target , PC)                        | 17        |
| 7.17 Sign ECC Read Request (Target , PC → IS-4500C1)                             | 18        |
| 7.18 NTAG Sign ECC Read Response (IS-4500C1 → Target , PC)                       | 18        |
| 7.19 AUTH0 Write Request (Target , PC → IS-4500C1)                               | 19        |
| 7.20 NTAG AUTH0 Write Response (IS-4500C1 → Target , PC)                         | 19        |
| 7.21 Access Protect Write Request (Target , PC → IS-4500C1)                      | 20        |
| 7.22 NTAG Access Protect Write Response (IS-4500C1 → Target , PC)                | 20        |
| 7.23 AUTH0, Access Protect State Request (Target , PC → IS-4500C1)               | 21        |
| 7.24 NTAG AUTH0, Access Protect State Response (IS-4500C1 → Target , PC)         | 21        |
| 7.25 24Bit Read Request (Target , PC → IS-4500C1)                                | 22        |
| 7.26 NTAG 24Bit Counter Read Response (IS-4500C1 → Target , PC)                  | 22        |
| 7.27 24bit Enable Request (Target , PC → IS-4500C1)                              | 23        |
| 7.28 NTAG 24bit Counter Enable Response (IS-4500C1 → Target , PC)                | 23        |
| 7.29 24bit Protect Request (Target , PC → IS-4500C1)                             | 24        |
| 7.30 NTAG 24bit Counter Protect Response (IS-4500C1 → Target , PC)               | 24        |
| 7.31 NTAG 24bit Counter Enable, Protect State Request (Target , PC → IS-4500C1)  | 25        |
| 7.32 NTAG 24bit Counter Enable, Protect State Response (IS-4500C1 → Target , PC) | 25        |

8. Related Document..... 26

## 1. Specification

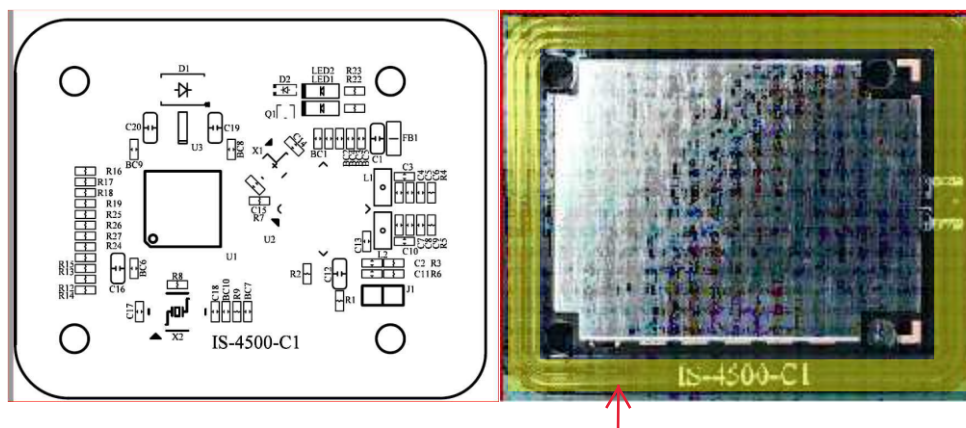
| Category       | Contents                                |
|----------------|-----------------------------------------|
| RF Frequency   | 13.56MHz                                |
| Power Supply   | 4.5 to 5.5V DV Operation                |
| Supply Current | 40mA @ 5V                               |
| Dimensions     | 43*35*6 mm                              |
| RF Protocol    | ISO 14443-A                             |
| Host Interface | TTL232,<br>USB To Serial(FTDI USB Chip) |
| Antenna        | 50-ohm Internal antenna                 |
| RF Power       | 150mW @ 5V                              |
| Read Range     | 50mm internal ant                       |
| Anticollision  | Support(1tags)                          |

- The RFID Reader is used after being mounted inside the equipment.

## 2. Configuration of IS-4500C1

### 2.1 Connect

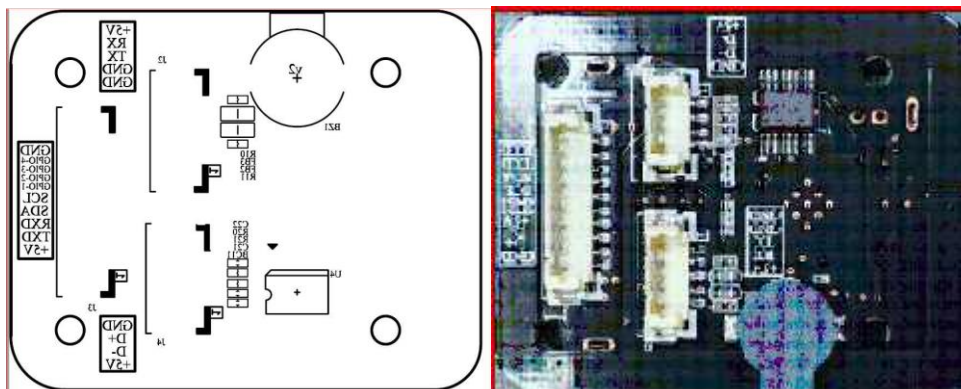
- PCB Top



PCB Loop Antenna

\* Only this antenna must be used when using this module.

- PCB Bottom



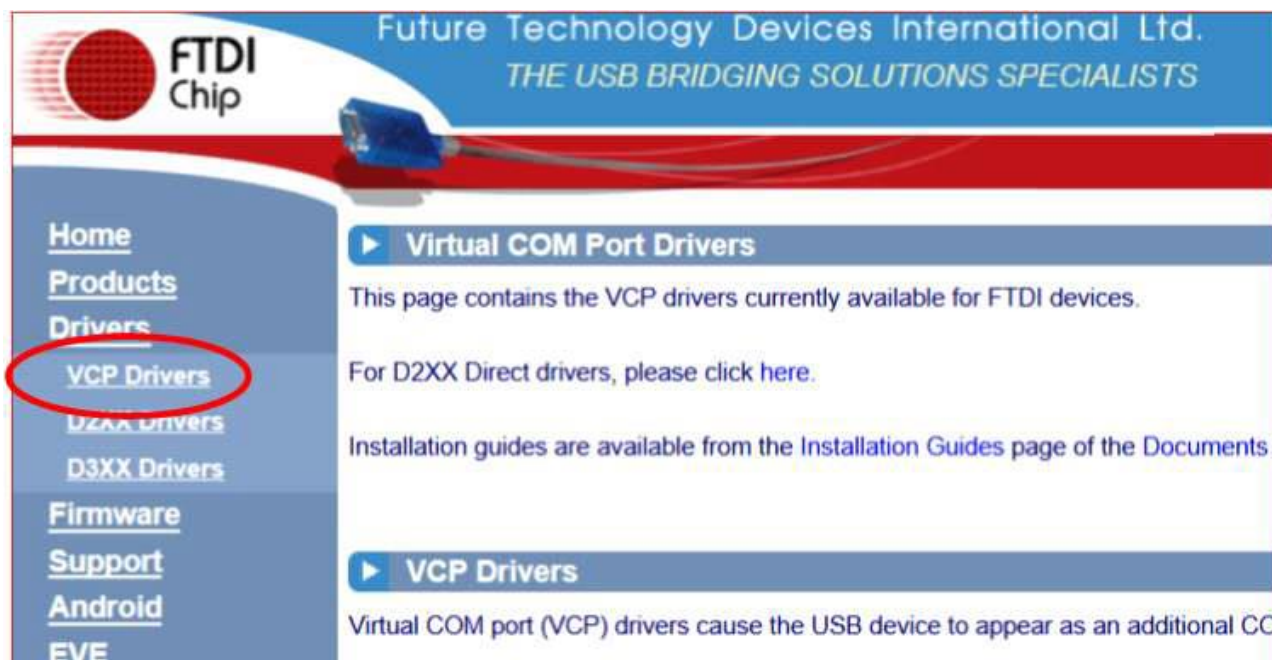
## 2.2 USB Driver

### (1) HID USB KeyBoard

- Automatically recognized without the need for driver installation.

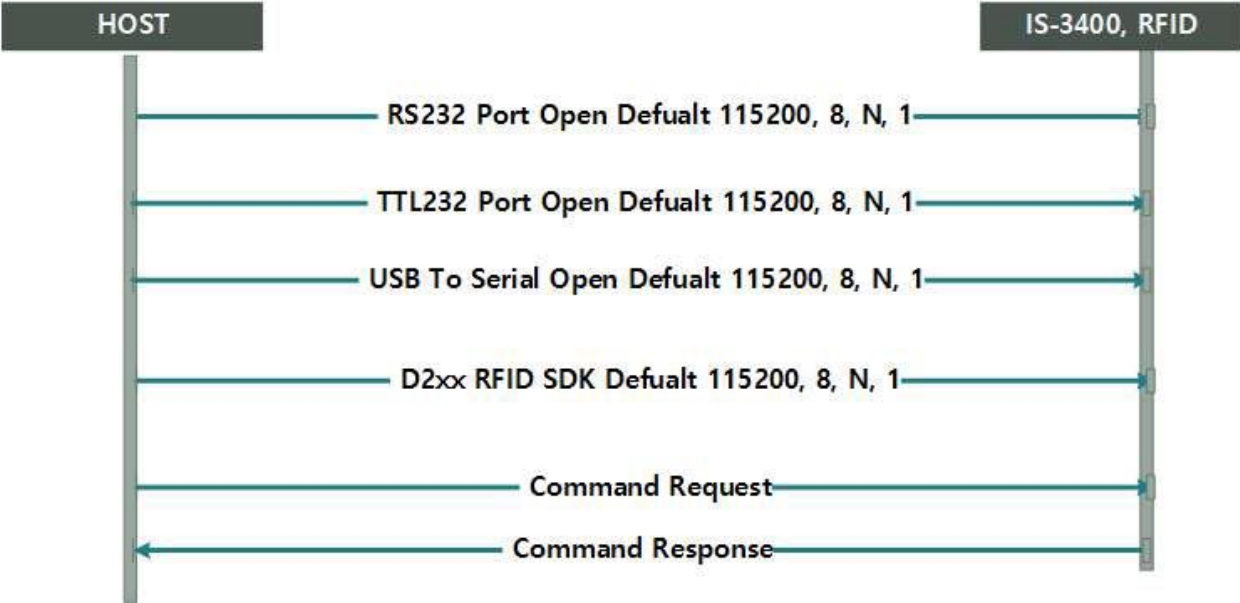
### (2) USB To Serial Driver

- USB Chip : FTDI230x
- Download site : <http://www.ftdichip.com/Drivers/VCP.htm>

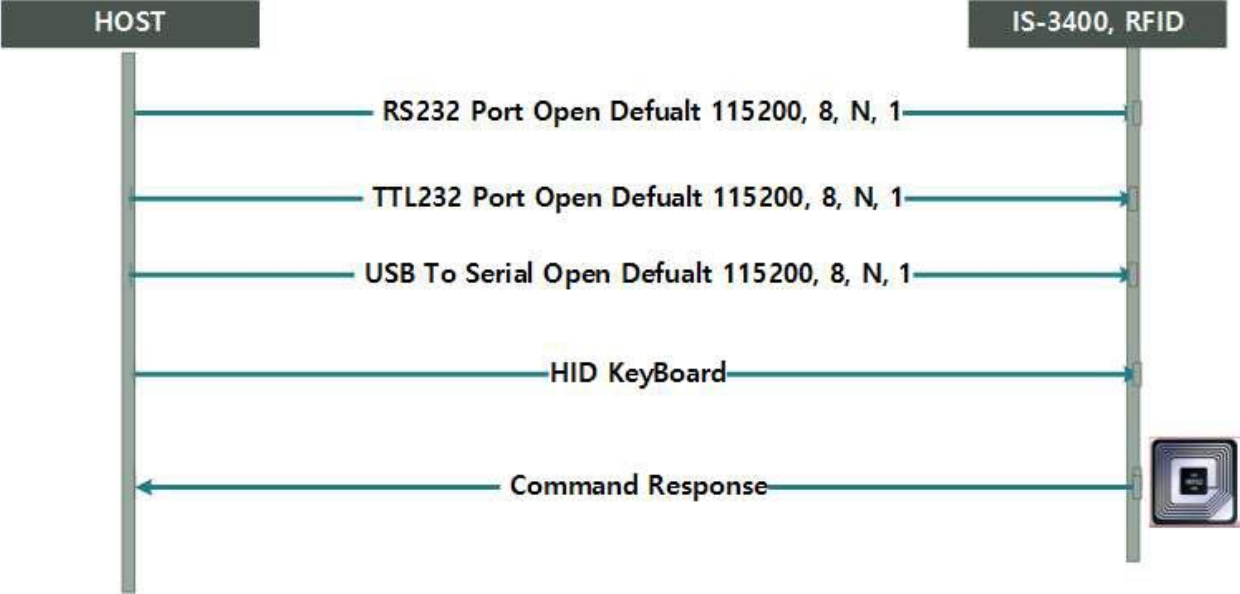


3. Operation method of IS-4500C1 RFID

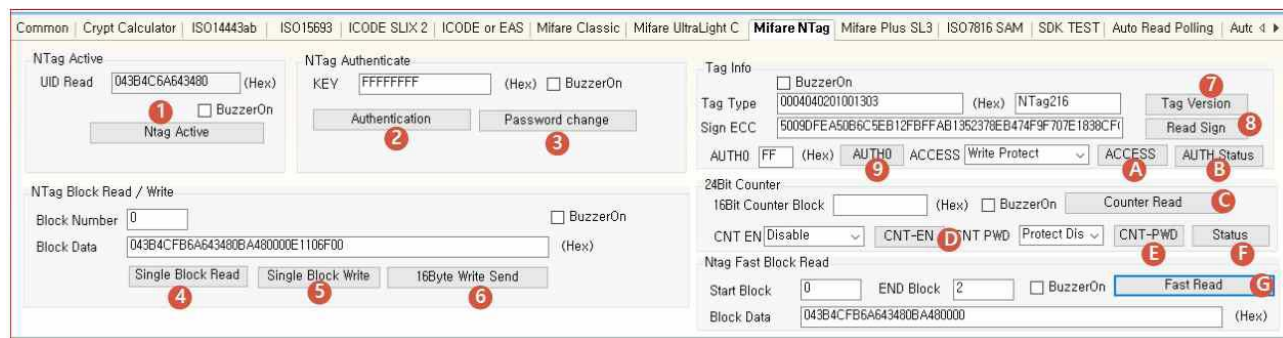
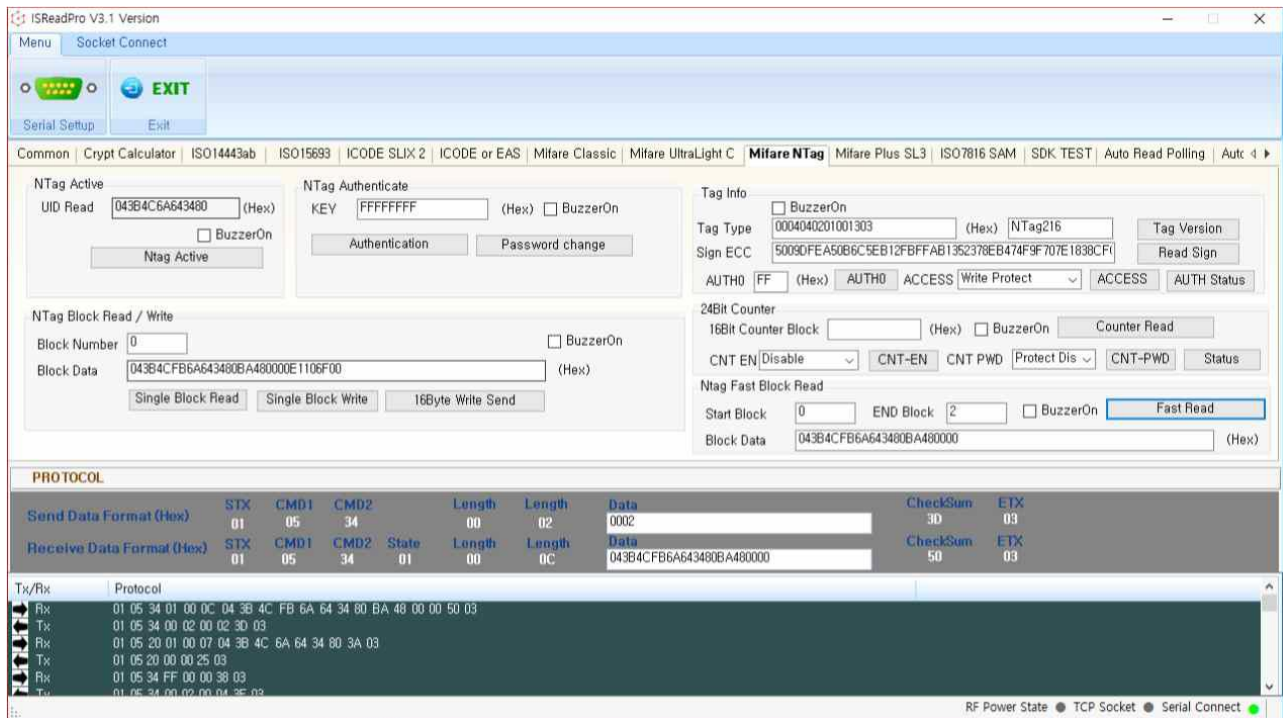
Dummy RFID Reader Support



Auto Polling RFID Reader Support



## 4. Usage of ISReaderPro V3.0



- (1) Enable NTAG.
- (2) Authenticate NTAG.
- (3) Change the value of the authentication key for the NTAG.
- (4) Retrieves block data from NTAG (16 bytes)
- (5) Write block data from NTAG. (4Byte)
- (6) Write the 16 Byte size to the NTAG at once.
- (7) Check the version and type of NTAG.
- (8) Reads the Sign ECC value of the NTAG.

- (9) Enter the block address to set up protection.
  - Available after authentication processing.
- (10) You can set the AUTH0 block data Write/Read Protect.
  - (2) Can be used after authentication processing
  - See the NTAG datasheet for more information.
- (11) You can view the current AUTH0 block address and Write/Read Protect settings information.
  - Available after authentication processing.
- (12) Reads the 24 Bit Counter value.
- (13) You can enable and disable the 24 Bit Counter. fi It can be used after authentication processing.
- (14) You can decide whether to use it after authentication processing with 24 Bit Counter, or to use it in general.
  - (2) Can be used after authentication processing
- (15) 24 Bit Counter Reads the current setup state.
- (16) Reads blocks in 4 bytes.

## 5. Protocol Format

### 5.1 Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC     |     | REMARK                             |
|-------------|------|----------|-----|------------------------------------|
| STX         | 1    | 0x01     | Hex | Start Data                         |
| Command1    | 1    | Command  | Hex | High rang command                  |
| Command2    | 1    | Command  | Hex | Low rank command                   |
| Data Length | 2    | Hi Byte  | Hex | Packet Lens                        |
| Data Length |      | Low Byte | Hex |                                    |
| Data        | N    |          | Hex | Request Data                       |
| Check Sum   | 1    |          | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03       | Hex | End Data                           |

A buzzer beep command when successful after Command2 is performed.

Command2 top-level bit to 1 will be beep, no beep if top-level bit is zero

[ Exmaple ] Card Serial Num , Beep sound generated Command

Command = 0x20 | 0x80;

| BIT 7                | BIT 6   | BIT 5 | BIT 4 | BIT 3 | BIT 2 | BIT 1 | BIT 0 |
|----------------------|---------|-------|-------|-------|-------|-------|-------|
| 1                    | 0       | 1     | 0     | 0     | 0     | 0     | 0     |
| Beep sound generated | Command |       |       |       |       |       |       |

### 5.2 Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC     |     | REMARK                                       |
|-------------|------|----------|-----|----------------------------------------------|
| STX         | 1    | 0x01     | Hex | Start Data                                   |
| Command1    | 1    | Command  | Hex | High rang command                            |
| Command2    | 1    | Command  | Hex | Low rank command                             |
| State       | 1    |          | Hex | Response state<br>0x01 : normal, 0xFF: error |
| Data Length | 2    | Hi Byte  | Hex | Packet Lens                                  |
| Data Length |      | Low Byte | Hex |                                              |
| Data        | N    |          | Hex | Request Data                                 |

|           |   |    |     |                                    |
|-----------|---|----|-----|------------------------------------|
| Check Sum | 1 |    | Hex | See “Check Sum calculation method” |
| ETX       | 1 | 03 | Hex | End Data                           |

## 6. Check Sum Calculation method

Check Sum = (BYTE)(Command1 + Command2 + Length(0) + Length(1) + Data(0) +  
Data(1) + Data(n) )

Example 1:

0x01 0x00 0x16 0x00 0x00 0x16 0x03

CMD1 CMD2 Length(0) Length(1) Check Sum

0x00 + 0x16 + 0x00 + 0x00 0x16

0x16 = 0x00 + 0x16 + 0x00 + 0x00

◆ Excluding Stx, Etx, CheckSum

Check Sum = (BYTE)(Command1 + Command2 + STATE + Length(0) + Length(1) +  
Data(0) + Data(1) + Data(n) )

Example 1:

0x01 0x00 0x16 0x01 0x00 0x00 0x16 0x03

CMD1 CMD2 STATE Length(0) Length(1) Check Sum

0x00 + 0x16 + 0x01 + 0x00 + 0x00 0x17

0x17 = 0x00 + 0x16 + 0x01 + 0x00 + 0x00

◆ Excluding Stx, Etx, CheckSum

## 7. Protocol (NTAG)

### 7.1 NTAG Active Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x20 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x00 | Hex |                                    |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

### 7.2 NTAG Active Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x20       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 4, 7       | Hex |                                    |
| Data        | 4, 7 |            | Hex | UID                                |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.3 NTAG Authenticate Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x30 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x04 | Hex |                                    |
| Data        | 4    |      | Hex | Authenticate Key Value             |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

### 7.4 NTAG Authenticate Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x30       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x00       | Hex |                                    |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

## 7.5 NTAG Authenticate Key Value Change Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x3B | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x04 | Hex |                                    |
| Data        | 4    |      | Hex | Authenticate Key Value             |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

## 7.6 NTAG Authenticate Key Value Change Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x3B       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x00       | Hex |                                    |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.7 NTAG Block Read 16 Byte Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x22 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x00 | Hex |                                    |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

### 7.8 NTAG Block Read 16 Byte Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x22       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x10       | Hex |                                    |
| Data        | 16   |            | Hex | Block Data 16 Byte                 |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

## 7.9 NTAG Block Read 4 Byte Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x22 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x02 | Hex |                                    |
| Data        | 1    |      | Hex | Start Block Address                |
| Data        | 1    |      | Hex | End Block Address                  |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

## 7.10 NTAG Block Read 4 Byte Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x22       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | N          | Hex |                                    |
| Data        | N    |            | Hex | Block Data                         |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.11 NTAG Block Write 4 Byte Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x23 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x04 | Hex |                                    |
| Data        | 4    |      | Hex | Block Data                         |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

### 7.12 NTAG Block Write 4 Byte Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x23       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x00       | Hex |                                    |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.13 NTAG Block Write 16 Byte Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x23 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x10 | Hex |                                    |
| Data        | 16   |      | Hex | Block Data                         |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

### 7.14 NTAG Block Write 16 Byte Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x23       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x00       | Hex |                                    |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.15 Version Read Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x32 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x00 | Hex |                                    |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

### 7.16 NTAG Version Read Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x32       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | N          | Hex |                                    |
| Data        | N    |            | Hex | NTAG Version information           |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.17 Sign ECC Read Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x33 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x00 | Hex |                                    |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

### 7.18 NTAG Sign ECC Read Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x33       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | N          | Hex |                                    |
| Data        | N    |            | Hex | Sign ECC Data                      |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.19 AUTH0 Write Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x35 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x01 | Hex |                                    |
| Data        | 1    |      | Hex | AUTH0 Data                         |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

### 7.20 NTAG AUTH0 Write Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x35       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x00       | Hex |                                    |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

## 7.21 Access Protect Write Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x35       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x00       | Hex |                                    |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

## 7.22 NTAG Access Protect Write Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                                            |
|-------------|------|------------|-----|---------------------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                                        |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command                   |
| Command 2   | 1    | 0x35       | Hex |                                                   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                                       |
| Data Length |      | 0x01       | Hex |                                                   |
| Data        | 1    | 0x00, 0x01 | Hex | 0x00 : Write Protect<br>0x01 : Read/Write Protect |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method”                |
| ETX         | 1    | 03         | Hex | End Data                                          |

### 7.23 AUTH0, Access Protect State Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x37 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x00 | Hex |                                    |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

### 7.24 NTAG AUTH0, Access Protect State Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                                                              |
|-------------|------|------------|-----|---------------------------------------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                                                          |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command                                     |
| Command 2   | 1    | 0x37       | Hex |                                                                     |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure                                    |
| Data Length | 2    | 0x00       | Hex | Packet Lens                                                         |
| Data Length |      | 0x02       | Hex |                                                                     |
| Data        | 1    |            | Hex | AUTH0 Data                                                          |
| Data        | 1    | 0x00, 0x01 | Hex | Access Protect<br>0x00 : Write Protect<br>0x01 : Read/Write Protect |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method”                                  |
| ETX         | 1    | 03         | Hex | End Data                                                            |

## 7.25 24Bit Read Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x31 | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x00 | Hex |                                    |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

## 7.26 NTAG 24Bit Counter Read Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x31       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x03       | Hex |                                    |
| Data        | 3    |            | Hex | 24Bit Counter Data                 |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.27 24bit Enable Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x38       | Hex |                                    |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x01       | Hex |                                    |
| Data        | 1    | 0x00, 0x01 | Hex | 0x00 : Disable<br>0x01 : Enable    |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.28 NTAG 24bit Counter Enable Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x38       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x00       | Hex |                                    |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.29 24bit Protect Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC       |     | REMARK                                          |
|-------------|------|------------|-----|-------------------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                                      |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command                 |
| Command 2   | 1    | 0x38       | Hex |                                                 |
| Data Length | 2    | 0x00       | Hex | Packet Lens                                     |
| Data Length |      | 0x01       | Hex |                                                 |
| Data        | 1    | 0x00, 0x01 | Hex | 0x00 : Protect Disable<br>0x01 : Protect Enable |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method”              |
| ETX         | 1    | 03         | Hex | End Data                                        |

### 7.30 NTAG 24bit Counter Protect Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                             |
|-------------|------|------------|-----|------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                         |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x38       | Hex |                                    |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure   |
| Data Length | 2    | 0x00       | Hex | Packet Lens                        |
| Data Length |      | 0x00       | Hex |                                    |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03         | Hex | End Data                           |

### 7.31 NTAG 24bit Counter Enable, Protect State Request (Target , PC → IS-4500C1)

| ITEM        | BYTE | DESC |     | REMARK                             |
|-------------|------|------|-----|------------------------------------|
| STX         | 1    | 0x01 | Hex | Start Data                         |
| Command 1   | 1    | 0x05 | Hex | 0x05 : NTAG, Ultralight Command    |
| Command 2   | 1    | 0x3A | Hex |                                    |
| Data Length | 2    | 0x00 | Hex | Packet Lens                        |
| Data Length |      | 0x00 | Hex |                                    |
| Check Sum   | 1    |      | Hex | See “Check Sum calculation method” |
| ETX         | 1    | 03   | Hex | End Data                           |

### 7.32 NTAG 24bit Counter Enable, Protect State Response (IS-4500C1 → Target , PC)

| ITEM        | BYTE | DESC       |     | REMARK                                                           |
|-------------|------|------------|-----|------------------------------------------------------------------|
| STX         | 1    | 0x01       | Hex | Start Data                                                       |
| Command 1   | 1    | 0x05       | Hex | 0x05 : NTAG, Ultralight Command                                  |
| Command 2   | 1    | 0x3A       | Hex |                                                                  |
| STATE       | 1    | 0x01, 0xFF | Hex | 0x01 : success<br>0xFF : failure                                 |
| Data Length | 2    | 0x00       | Hex | Packet Lens                                                      |
| Data Length |      | 0x02       | Hex |                                                                  |
| Data        | 1    | 0x00, 0x00 | Hex | 0x00 : 24Bit Counter Disable<br>0x01 : 24Bit Counter Enable      |
| Data        | 1    | 0x00, 0x01 | Hex | 24Bit Counter<br>0x00 : Protect Disable<br>0x01 : Protect Enable |
| Check Sum   | 1    |            | Hex | See “Check Sum calculation method”                               |
| ETX         | 1    | 03         | Hex | End Data                                                         |

## 8. Related Document

- IS-4500C1-Reader-NTAG\_Manual (IKSUNG ELECTRONICS)
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## 9. FCC Statement and User Information

- This module satisfies the Part15C rule, and when integrated into the host, it must be verified that it meets the Part 15B standard.
- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
  - (1) This device may not cause harmful interference, and
  - (2) this device must accept any interference received, including interference that may cause undesired operation.
- Changes or modifications not expressly approved by the manufacturer (or party responsible) for compliance could void the user's authority to operate the equipment
- The satisfy FCC exterior labeling requirements, the following text must be placed on the exterior of the end product.
  - Contains Transmitter module FCC ID: 2AYHQ-IS-4500-C1
- This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. This device must not be co-located or operating in conjunction with any other antenna or transmitter. This device is intended only for OEM integrators and following statements shall be included to host user manual: *This module may not be co-located with any other transmitters or antennas.* This module uses an integrated PCB loop antenna, and only this antenna should be used. As long as conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements with this module installed. In the event that this condition cannot be met, then the FCC authorizations are no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product including this module and obtaining separate FCC authorizations.